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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
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09/643,766 08/23/00 TURK

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IM31/0803  
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EXAMINER

ART UNIT

PAPER NUMBER

DATE MAILED:

08/03/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.

09/643,946

Applicant(s)

TOREK ET AL.

Examiner

LAN VINH

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 23 August 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 142-163 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 142-163 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3,4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 158 is rejected under 35 U.S.C. 102(b) as being anticipated by Takeuchi ( US 5,017,513 ).

Takeuchi discloses a method for manufacturing a semiconductor device comprises the step of immersing the semiconductor substrate into a etching/cleaning solution. This solution is a mixed solution of HF, phosphoric acid and alcohol ( col 5, lines 4-6 ). Since alcohol is a known non-aqueous solvent ( see prior art of record ), Takeuchi's solution reads on a solution for removing/cleaning residues on a semiconductor substrate consisting essentially of a fluorine source, a complimentary acid and a non-aqueous solvent.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 142-157, 160-163 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schellenberger et al. ( US 5,714,203 ) in view of Ward et al ( US 5,988,186 )

Schellenberger discloses a method for drying semiconductor substrate including the step of dipping the substrate in a cleaning solution. This solution comprises of:

hydrofluoric acid (HF) ( col 3, lines 55-56 )

acids such as hydrochloric acid (HCl), phosphoric acid (H<sub>3</sub>PO<sub>4</sub>) ( col 3, lines 58-59 )

alcohol ( col 3, lines 56-57 )

citric acid ( col 3, lines 57-58 )

Unlike the instant claimed inventions as per claims 142, 150, Schellenberger does not specifically disclose using propylene glycol ( a known non-aqueous solvent/ alcohol ) in the cleaning solution although Schellenberger does disclose using alcohol in the cleaning solution.

However, Ward discloses an acidic semiconductor cleaning solution containing alcohol such as propylene glycol ( col 4, lines 40-42 )

Therefore, one skilled in the art would have found it obvious to modify Schellenberger 's cleaning solution by using propylene glycol in the solution in view of Ward teaching because Schellenberger suggests that alcohol can be used in the cleaning solution and Ward teaches that solvent/alcohol which can be used in the semiconductor cleaning solution include and not limit to polyhydric alcohol such as propylene glycol ( col 4, lines 40-42 )

Regarding claims 143, 151, 160-163, Schellenberger's cleaning solution differs from the claimed cleaning solution by having additives such as surfactant, solid additive whereas the claimed cleaning solution consisting essentially of :HF, phosphoric acid/hydrochloric acid, alcohol/propylene glycol and nitric acid. However, since Schellenberger discloses using 0-50 wt% of acids, 0-80 wt% of alcohol, 0-5 wt% of surfactant and 0-50 wt % of solid additive ( col 3, lines 63-65 ), one skilled in the art would have found it obvious to adjust the concentration of the components in Schellenberger's cleaning solution through routine experimentation to achieve a cleaning solution consisting essentially of :HF, phosphoric acid, alcohol/propylene glycol and nitric acid.

Regarding claims 144-149, 152-157, Schellenberger fails to disclose the specific proportion/concentration of the components in the cleaning solution although Schellenberger does disclose the adjustable concentration ranges of the components as described above. Therefore, the selection of the specific proportion/concentration of the components in the cleaning solution would have been obvious because the selection of particular values for these variable would simply involve routine experimentation to discover the optimum or workable ranges.

5. Claims 159 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi ( US 5,017,513 ) in view of Ward et al ( US 5,988,186 )

Takeuchi's cleaning solution has been described above in paragraph 2. Unlike the instant claimed inventions as per claims 159, Takeuchi does not specifically disclose

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using propylene glycol ( a known alcohol ) in the cleaning solution although Takeuchi does disclose using alcohol in the cleaning solution.

However, Ward discloses an acidic semiconductor cleaning solution containing alcohol such as propylene glycol ( col 4, lines 40-42 )

Therefore, one skilled in the art would have found it obvious to modify Takeuchi 's cleaning solution by using propylene glycol in the solution in view of Ward teaching because Takeuchi suggests that alcohol can be used in the cleaning solution and Ward teaches that solvent/alcohol which can be used in the semiconductor cleaning solution include and not limit to polyhydric alcohol such as propylene glycol ( col 4, lines 40-42 )

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Woo et al ( US 5,698,041 ) discloses that propylene glycol is a non-aqueous solvent ( col 9, lines 18-20 )

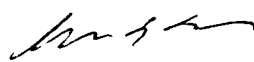
Jagannathan et al. ( US 5,304,284 ) discloses that alcohols are non-aqueous solvents ( col 5, lines 46-48 )

**Conclusion**

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAN VINH whose telephone number is 703 305-6302. The examiner can normally be reached on Monday-Friday 8:30 -6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, BENJAMIN L UTECH can be reached on 703 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703 305-3599 for regular communications and 703 305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0661.

  
BENJAMIN L. UTECH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY - PITCH 1700

LV  
July 31, 2001